

PATENT SPECIFICATION

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DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Method of and Apparatus for Mixing Materials.

We, IMPERIAL CHEMICAL INDUSTRIES LIMITED, a British Company, of Imperial Chemical House, Millbank, London, S.W.1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to mixing materials and apparatus for that purpose.

According to the invention there is provided a method of mixing using a mixing means within a stationary mixing vessel, in which the action of the mixing means is derived from the motion relative to an internal surface within the vessel of at least one wheel-like member, to which the mixing means is directly or indirectly coupled, the wheel-like member being impressed against and moved along the internal surface.

Preferably the wheel-like member is impressed against and moved along the wall of the vessel. The movement, along the said wall, of the wheel-like member may be achieved either by hand or mechanically. For example the wheel-like member may be spring or hydraulically loaded to impress it against the wall of the vessel, and a shaft on which the wheel-like member is mounted may be urged along mechanically or by hand in the direction of the surface along which the wheel-like member is moved.

There is also provided apparatus for use in a method of mixing according to the invention, which comprises a mounting member, at least one wheel-like member rotatable about the axis of the mounting member and adapted to be impressed against and moved along an internal surface within a stationary vessel, and mixing means coupled directly or indirectly to the wheel-

like member, and adapted to rotate when the wheel-like member is moved along an internal surface within a stationary vessel.

Conveniently the mixing means is coupled directly to the wheel-like member or members, in which case the rotating action of the mixing means is derived directly from the motion of the wheel-like member or members. Alternatively the mixing means may be indirectly driven, for example through an epicyclic gear train.

The mounting member and mixing means may be relatively rotatable. A suitable arrangement of bearings may be provided for this purpose, for example a spindle forming part of the mounting member, which is attached to the mixing means, may be arranged to rotate relatively to the mounting member by means, for instance, of ball-bearings, roller bearings or the like, or such bearings may be used to mount the mixing means on the mounting member.

The wheel-like member or members may, for example, be a disc, a cylinder, a sphere, a spheroid or an ellipsoid. They may be coupled to either or both ends of the mixing means.

The mixing means preferably comprises an arrangement of blades. More preferably the blades have a propeller configuration about the axis of the wheel-like member or members, whereby axial as well as radial motion is imparted to the material being mixed, i.e. the blades may be inclined to the axis. A further preference is for the blades to be spaced from the axis to facilitate the passage of the axially propelled material.

The direction of axial motion will depend on the 'hand' of the propeller configuration and the direction of movement of the wheel-

[Priority claim.]

like member along the internal surface within the vessel. In some cases it is preferable to convey the material being stirred in a particular axial direction. Thus in the mixing of plaster, where it is often desirable to add the powdery material to water, it is advantageous to have the mixing means rotate so as to transfer material from the top to the bottom of the vessel.

When adding water or other fluids to, for example, paint for thinning purposes it is best to have the mixing means rotate in the opposite direction, in order to achieve an upward axial flow of the material.

The blades may have the same width along their length, but when the blades have a propeller configuration it is useful to have them tapering in the axial direction. For example if the blades are of greater width at the end nearer the top of the mixing vessel than at the other end, the material tends to be drawn in an axially downwards direction more effectively than in an axially upwards direction.

The components of a mixing apparatus in accordance with the invention may be constructed from a wide variety of materials. Metals and plastics are particularly convenient.

It may be convenient for the assembly comprising the wheel-like member or members and the mixing means to be moulded as a single unit.

Two specific forms of mixing apparatus according to the present invention will now be described with reference to the drawing accompanying the provisional specification of this application.

In the embodiment illustrated by Figure 1 the wheel 1 is mounted on the spindle extension 2 of the shaft 3 which is provided with a suitable handle 4. The mixing means 5 in the form of blades is attached at one end to the wheel 1 and at the other end to disc 6. The blades of the mixing means 5 are permitted to rotate relative to the spindle 2 and shaft 3 by means of suitable bearings between the spindle 2 and the disc 6 and wheel 1 respectively.

In the embodiment illustrated by Figure 2 the blades 5 are attached via the wheel 1 and the disc 6 to the spindle extension 2 of the shaft 3, which is located co-axially within the handle 4 and arranged to rotate relative thereto by means of ball-bearings mounted in the handle 4.

In each of these two embodiments of the invention the action of the blades 5 is derived from the motion of the wheel 1 relative to an internal surface of the vessel in which the mixing is carried out, when by manipulation of the handle 4 the wheel 1 is impressed against the internal wall of the vessel and rotated by movement along the wall.

Such a vessel may, for example be a household bucket or a trough.

It is envisaged that the method of mixing according to the invention will have applications in many fields other than in the mixing of plaster and water, and paint and a thinning fluid as described above. For example it may be applied to the mixing of flour or other material of a similar consistency.

WHAT WE CLAIM IS:—

1. A method of mixing using a mixing means within a stationary mixing vessel, in which the action of the mixing means is derived from the motion relative to an internal surface within the vessel of at least one wheel-like member, to which the mixing means is directly or indirectly coupled, the wheel-like member being impressed against and moved along the internal surface.
2. A method of mixing according to Claim 1 in which the wheel-like member is impressed against and moved along the wall of the vessel.
3. Apparatus for use in a method of mixing according to claim 1 or claim 2, which comprises a mounting member, at least one wheel-like member rotatable about the axis of the mounting member and adapted to be impressed against and moved along an internal surface within a stationary vessel, and mixing means coupled directly or indirectly to the wheel-like member and adapted to rotate when the wheel-like member is moved along an internal surface within a stationary vessel.
4. Apparatus according to Claim 3 in which the mixing means is coupled directly to the wheel-like member.
5. Apparatus according to either Claim 3 or Claim 4 in which the mounting member and the mixing means are relatively rotatable.
6. Apparatus according to any one of Claims 3 to 5 in which the wheel-like member is a disc.
7. Apparatus according to any one of Claims 3 to 6 in which the mixing means comprises an arrangement of blades.
8. Apparatus according to Claim 7 in which the blades have a propeller configuration about the axis of the wheel-like member.
9. Apparatus according to Claim 7 or Claim 8 in which the blades are spaced from the axis of the wheel-like member.
10. Apparatus according to Claim 8 or 9 in which the blades taper in the axial direction.
11. A method of mixing substantially as described herein.
12. Apparatus for use in a mixing vessel, substantially as described herein with reference to the drawing accompanying the provisional specification.

13. Material whenever mixed by a
method according to any one of Claims 1,
2 or 11.

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1 SHEET

PROVISIONAL SPECIFICATION
This drawing is a reproduction of
the Original on a reduced scale

